

What is claimed is:

1. A method for controlling operation of a radiotelephone, the method comprising:

determining if a radiotelephone is activated for use;

when the radiotelephone is activated, determining if the radiotelephone is within a selected proximity zone of a radiotelephone user;

when the radiotelephone is activated and is within the proximity zone, estimating a distance d between the radiotelephone and the user and adjusting a radiotelephone speaker volume control according to the estimated distance.

2. The method of claim 1, further comprising:

when said radiotelephone is activated and is not within said proximity zone, taking at least one of the following actions: refraining from adjusting said speaker volume control; adjusting said speaker volume control to its maximum audio level; providing a notification that said radiotelephone is not within said proximity zone; and disabling said speaker until said radiotelephone is within said proximity zone.

3. The method of claim 1, further comprising:

providing a minimum value $V_s(\text{min})$ of said speaker volume and a maximum value $V_s(\text{max})$ of said speaker volume; and

allowing said speaker volume to vary monotonically with said distance d between the values $V_s(\text{min})$ and $V_s(\text{max})$, when said radiotelephone is within said proximity zone.

4. The method of claim 3, further comprising allowing at least one of said values $V_s(\min)$ and $V_s(\max)$ to be adjusted by said user.

5. The method of claim 1, further comprising:

when said radiotelephone is activated, and is within said proximity zone, adjusting a radiotelephone microphone gain control according to said estimated distance.

6. The method of claim 5, further comprising:

when said radiotelephone is activated and is not within said proximity zone, taking at least one of the following actions: refraining from adjusting said microphone gain control; adjusting said microphone gain control to its maximum audio level; providing a notification that said radiotelephone is not within said proximity zone; and disabling said microphone until said radiotelephone is within said proximity zone.

7. The method of claim 5, further comprising:

providing a minimum value $G_m(\min)$ of said microphone gain and a maximum value $G_m(\max)$ of said microphone gain; and

allowing said microphone gain to vary monotonically with said distance d between the values $G_m(\min)$ and $G_m(\max)$, when said radiotelephone is within said proximity zone.

8. The method of claim 7, further comprising allowing at least one of said values $G_m(\min)$ and $G_m(\max)$ to be adjusted by said user.

9. The method of claim 1, further comprising determining whether said radiotelephone is within said proximity zone by a procedure comprising at least one of the following processes:

(i) transmitting at least one infrared signal, allowing the infrared signal to be reflected from a signal-reflecting object, measuring the signal strength of the reflected infrared signal as received at said radiotelephone, and comparing the reflected infrared signal with at least one selected threshold infrared signal strength;

(ii) transmitting at least one photoelectric signal, allowing the photoelectric signal to be reflected from a signal-reflecting object, measuring the signal strength of the reflected photoelectric signal as received at said radiotelephone, and comparing the reflected photoelectric signal with at least one selected threshold photoelectric signal strength;

(iii) transmitting at least one sound signal, allowing the sound signal to be reflected from a signal-reflecting object, measuring the signal strength of the reflected sound signal as received at said radiotelephone, and comparing the reflected sound signal with at least one selected threshold sound signal strength;

(iv) estimating a distance from an object to a capacitive sensor located at said radiotelephone; and

(v) estimating a temperature of a selected surface within said proximity zone and comparing the estimated temperature with at least one threshold temperature.

10. The method of claim 9, further comprising providing at least one of said infrared signal, said photoelectric signal and said sound signal with a selected signal indicium that distinguishes this signal from a background signal.

11. The method of claim 9, further comprising choosing said at least one threshold temperature to be at least 32 °C.

12. A system for controlling activation of a radiotelephone, the system comprising:

an activation sensor that determines if a radiotelephone is activated for use;

a distance sensor, associated with the radiotelephone, that estimates a distance d from the radiotelephone to the user, and that determines when the radiotelephone is within a selected radiotelephone proximity zone;

a speaker volume control, connected to a speaker on the radiotelephone, that receives the estimated distance and adjusts the speaker volume according to the estimated distance between the radiotelephone and the user, when the radiotelephone is within the proximity zone.

13. The system of claim 12, wherein said system is configured so that:

when said radiotelephone is activated and is not within said proximity zone, said system takes at least one of the following actions: refraining from adjusting said speaker volume control; adjusting said speaker volume control to its maximum audio level; providing a notification that said radiotelephone is not within said proximity zone; and disabling said speaker until said radiotelephone is within said proximity zone.

14. of claim 12, wherein said system is configured:

to provide a minimum value $V_s(\text{min})$ of said speaker volume and a maximum value $V_s(\text{max})$ of said speaker volume; and

to allow said speaker volume to vary monotonically with said distance d between the values $V_s(\min)$ and $V_s(\max)$, when said radiotelephone is within said proximity zone.

15. The system of claim 14, wherein said system is configured to allow at least one of said values $V_s(\min)$ and $V_s(\max)$ to be adjusted by said user.

16. The system of claim 12, further comprising a microphone gain control, connected to a microphone on the radiotelephone, that receives said estimated distance and adjusts the microphone gain according to said estimated distance between the radiotelephone and the user.

17. The system of claim 16, wherein said system is configured so that:
when said radiotelephone is activated and is not within said proximity zone, said system takes at least one of the following actions: refraining from adjusting said microphone gain control; adjusting said microphone gain control to its maximum audio level; providing a notification that said radiotelephone is not within said proximity zone; and disabling said microphone until said radiotelephone is within said proximity zone.

18. of claim 16, wherein said system is configured:
to provide a minimum value $G_m(\min)$ of said microphone gain and a maximum value $G_m(\max)$ of said microphone gain; and
to allow said microphone gain to vary monotonically with said distance d between the values $G_m(\min)$ and $G_m(\max)$, when said radiotelephone is within said proximity zone.

19. The system of claim 18, wherein said system is configured to allow at least one of said values $G_m(\text{min})$ and $G_m(\text{max})$ to be adjusted by said user.

20. The system of claim 12, wherein said system determines whether said radiotelephone is within said proximity zone by a procedure comprising at least one of the following processes:

(i) transmitting at least one infrared signal, allowing the infrared signal to be reflected from a signal-reflecting object, measuring the signal strength of the reflected infrared signal as received at said radiotelephone, and comparing the reflected infrared signal with at least one selected threshold infrared signal strength;

(ii) transmitting at least one photoelectric signal, allowing the photoelectric signal to be reflected from a signal-reflecting object, measuring the signal strength of the reflected photoelectric signal as received at said radiotelephone, and comparing the reflected photoelectric signal with at least one selected threshold photoelectric signal strength;

(iii) transmitting at least one sound signal, allowing the sound signal to be reflected from a signal-reflecting object, measuring the signal strength of the reflected sound signal as received at said radiotelephone, and comparing the reflected sound signal with at least one selected threshold sound signal strength;

(iv) estimating a distance from an object to a capacitive sensor located at said radiotelephone; and

(v) estimating a temperature of a selected surface within said proximity zone and comparing the estimated temperature with at least one threshold temperature.

21. The system of claim 20, wherein at least one of said infrared signal, said photoelectric signal and said sound signal is provided with a selected signal indicium that distinguishes this signal from a background signal.

22. The system of claim 20, wherein said at least one threshold temperature is chosen to be at least 32 °C.